BATTERY SAFETY REFERENCE GUIDE

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REV A

BATTERY SAFETY REFERENCE GUIDE

This guide contains practical safety related information for users of CECOM managed batteries or equipment using these batteries.

Next Generation Secondary Batteries and Primary Equivalents

This section identifies the next generation secondary (rechargeable) batteries, and equivalent primary (non-rechargeable) batteries. The manufacturer of the secondary batteries is Brentronics, utilizing cells supplied by other manufacturers.

Secondary	Chem (note 1)	NSN	Primary Equivalent	Chem	Typical Applications (note 2)
BB-388A/U	NiMH	6140-01-419-8190	BA-5588	$LiSO_2$	AN/PRC-126
BB-390A/U	NiMH	6140-01-375-9329	BA-5590	$LiSO_2$	SINCGARS
BB-503A/U	NiCd	6140-01-419-8193	N/A	N/A	AN/TAS-5
BB-516A/U	NiCd	6140-01-042-9942	N/A	N/A	MELIOS
BB-2847/U	Li Ion	6140-01-419-8194	BA-5847	$LiSO_2$	TWS

KEY:
NOTE (1) Nickel Metal Hydride (NiMH), Nickel Cadmium (NiCd). Lithium Ion battery contains no lithium metal.
NOTE (2) The BB-388, BB-390, BB-2847 batteries can be used in all end items utilizing the primary equivalent batteries. See appendix A for a complete listing of end items. For operational characteristics of these secondary batteries in the end items, contact the AMC Battery Management Office (see Appendix C).

Next Generation Primary Batteries

This section addresses the next generation primary (non-rechargeable) batteries that will be available beginning July 1997. The rectangular batteries are manufactured by PCI, and cylindrical batteries are manufactured by Bluestar. The type (rectangular vs. cylindrical) of battery, number of cells, safety features, use of a Complete Discharge Device (CDD), use of State of Charge Indicator (SOCI), chemistry, and battery voltage are identified in the table, below, for each battery.

Nomenclature	Type (note 1)	QTY Cells	Safety Features (note 2)	CDD (note 3)	SOCI (note 4)	Chem	Voltage
BA-5847C/U (note 5)	Rec	2	X	X	X	LiSO2	6
BA-5599A/U	Rec	3	X	X	X	LiSO2	9
BA-5112/U	Rec	4	X	X	N/A	LiSO2	12
BA-5598A/U	Rec	5	X	X	X	LiSO2	3/15
BA-5588A/U	Rec	5	X	X	X	LiSO2	15
BA-5093/U	Rec	9	X	X	N/A	LiSO2	27
BA-5557A/U	Rec	10	X	X	X	LiSO2	15/30
BA-5590A/U	Rec	10	X	X	X	LiSO2	15/30
BA-5567/U	Cyl	1	N/A	N/A	N/A	LISO2	3
BA-5600/U	Cyl	3	X	X	N/A	LiSO2	9
BA-5800/U	Cyl	2	X	X	N/A	LiSO2	6
BA-5372/U	Cyl	2	N/A	N/A	N/A	LiMnO2	6.5

KEY:
NOTE (1) Rectangular (Rec)-PCI, Cylindrical (Cyl)-Bluestar
NOTE (2) Safety Features include overcurrent protection (electrical fuse), overtemperature protection (thermal fuse), and charge protection (diode).
NOTE (3) Complete Discharge Device (CDD) is used to reduce the amount of active lithium to permit disposal as non hazardous material. The CDD consists of a resistor and switch. Resistor is connected across cell string, bypassing all safety features. N/A=quantity of lithium is less than .5g per battery.
NOTE (4) State Of Charge Indicator (SOCI) provides % of remaining battery capacity in four ranges. Consists of a momentary switch and display (two green LEDS).
NOTE (5) The BA-5847B battery manufactured by Saft is also available via an emergency buy. This battery uses a pull-out type of CDD, different than the normal push activated switch. Also, the BA-5847B battery is a lower capacity battery than the BA-5847C.

BA-5590 Battery End Items and Recommended Usage Hours

The end items that are listed below utilize the BA-5590 battery. This table also identifies the maximum number of hours (per CECOM GPM 96-013) that the Saft batteries (contract number DAAB07-90-C020) can be safely utilized in this equipment (however, these batteries are not permitted in the SAWE-MILES II). Other manufacturers BA-5590 batteries can safely be used in the end items, including SAWE MILES II, up to the normal recommended number of hours.

		USAGE HOURS Per GPM 96-013	
		NORMAL	LOW
EQUIPMENT	NOMENCLATURE	TEMP	TEMP
AMBIENT BACKPACK	AMBIENT AIR MICROCLIMATE COOLING BACKPACK	6	6
AMUT	ADVANCED MANPORTABLE UHF TERMINAL	29	10
AN/PDR-75	COMPUTER INDICATOR RADIAC SET	29	10
AN/PIH-1	PUBLIC ADDRESS SET	11	6
AN/PPN-19	TRANSPONDER RADAR SET	19	10
AN/PRC-104	HIGH FREQUENCY RADIO SET	23	7
AN/PRC-113	ULTRA-HIGH FREQUENCY RADIO	27	9
AN/PRC-119	SINCGARS RADIO (MANPACK)	16	6
AN/PRC-119A	SINCGARS RADIO (MANPACK)	25	16
AN/PSC-3	RT-1402/G MAIN SYSTEM, SATELLITE RADIO	9	3
AN/PSQ-4	POSITION LOCATION REPORTING SYSTEM - Manpack	16	6
AN/PSQ-6 (EPLRS)	ENHANCED POSITION LOCATION REPORTING SYSTEM	16	9
AN/TAS-4A	NIGHT VISION SIGHT FOR TOW	5	1
AN/TAS-6A	NIGHT OBSERVATION DEVICE LONG RANGE (NDDLR)	5	1
AN/UIH-6	MANPORTABLE PUBLIC ADDRESS SYSTEM	2	1
AN/UIH-6A	MANPORTABLE PUBLIC ADDRESS SYSTEM	2	1
AN/URC-100	VHF/UHF-TRANSCEIVER	16	11
AN/URC-110	DATA TRANSCEIVER	16	11
AN/URN-27	MANPACK BEACON RADIO	6	1
C-10377/GTC	COMSEC MODE SELECTOR CONTROL	37	18
C-11166/GRC	RADIO SET CONTROL	76	35
C-11561(C)/U W/LS-685/U - normal	CONTROL , RECEIVER TRANSMITTER	13	8
C-11561(C)/U W/LS-685/U - heavy	CONTROL , RECEIVER TRANSMITTER	10	7
C-11561(C)/U W/O LS-685/U - normal	CONTROL , RECEIVER TRANSMITTER	38	25
C-11561(C)/U W/O LS-685/U -heavy	CONTROL , RECEIVER TRANSMITTER	32	21
COMMO DECEPTION	COMMUNICATIONS ELECTRONICS WARFARE DECOY	5	1
COMPACT LASER DEMONS	COMPACT LASER DEMONSTRATOR	3	1
EFCS	ELECTRONIC FILMLESS CAMERA SYSTEM	3	1
JAVELIN	ADVANCED ANTI-TANK WEAPON SYSTEM	3	1
L B S R	LIGHTWEIGHT BATTLEFIELD SURVEILLANCE RADAR	3	1
LST-5	SATELLITE RADIO	14	7
LTM	LASER TARGET MARKER	2	1
M-22 ACADA	AUTOMATIC CHEMICAL AGENT DETECTOR ALARM	25	13
M21	REMOTE SENDING CHEMICAL AGENT ALARM. (Nerve	11	9
MAFIS UFE	MOBILE AUTOMATED FIELD INSTRUM. SYS UNIV FIELD	13	5
MST-20 PLUS	MANPACK UHF SATELLITE TRANSCEIVER	13	5
OD-144/GYK-29	BATTERY COMPUTER SYSTEM - GUN DISPLAY UNIT	14	5
OE-239	REMBASS ANTENNA GROUP	224	112
PLAYER UNIT	MANPACKED PLAYER UNIT FOR CMTC-IS	15	13
PM-15	CRYPTO TRANSMISSION UPGRADE MODEM	9	3
PM-15A	CRYPTO TRANSMISSION UPGRADE MODEM	16	7
RT-1175/GSQ	REMBASS, RADIO REPEATER, HAND EMPLACED	89	48
SM-755/GSQ	SM-755 TRAINER, SAME POWER REGDS AN/GSQ-187	9	5
SOFLAM, AN/PEQ-1	SPECIAL FORCES LASER MARKER, AN/PEQ-1	5	2
SOLDIER SYS COMPUTER	PORTABLE COMPUTER	9	8
TSEC/HYX-57	SPEECH SECURITY EQUIPMENT (REMOTE)	49	21
TSEC/KY-57	VINSON	42	17
TSEC/KY-67	BANCROFT	15	5
TSEC/KY-99	MINTERM	42	17

SAWE-MILES II Can not use batteries manufactured by Saft under this contract

BA-5800 BATTERY QUICK REFERENCE GUIDE

THIS GUIDE IDENTIFIES THE CORRECT BA-5800 BATTERY FOR EACH END ITEM. This information has been extracted from CECOM Ground Precautionary Message (GPM) 96-012, DTG 171952Z SEP 96.

The first step in using this chart is to determine if an end item listed in the table is used. The second step is to reference the chart to determine which BA-5800 batteries may be safely used (i.e., annotated with a "YES") in the end item. Additional requirements and limitations are identified in the notes section.

This chart has been distributed to CECOM LARs for reference, and provided to PS Magazine for incorporation. This chart will also be provided to GPS users for incorporation into TM's.

Manufacturer	***Contract Number***	***Battery ID***	***NSN***
Ballard	DAAB07-90-C-C024	C024	6665-99-760-9742
Ballard	Unknown	7728	6135-21-906-7728
Crompton Eternacell (note 1)	DAAB07-91-C-R014	R014	6665-99-760-9742
Power Conversions Inc. (note 2)	DAAB07-94-D-E002	E002	6665-99-760-9742
Power Conversions Inc.	DAAB07-90-C-C025	C025	6665-99-760-9742
Saft America (note 2)	DAAB07-94-D-E004	E004	6665-99-760-9742

End Item	***Battery ID***					
	C024	***C025***	***E002***	***E004***	***R014***	***7728***
AN/ASN-169 (note 3), Standalone Aviation GPS Receiver (SAGR)	***NO***	YES	YES	YES	***NO***	***NO***
AN/PSG-7 (V)1, Forward Entry Device (FED)	YES	YES	YES	YES	***NO***	***NO***
AN/PSG-7 (V)2, FED	YES	YES	YES	YES	***NO***	***NO***
AN/PSN-10 (note 3), Small Lightweight GPS Receiver (SLGR)	***NO***	YES	YES	YES	***NO***	***NO***
AN/PSN-11 (note 4), Precision Lightweight GPS Receiver (PLGR)	YES	YES	YES	YES	***NO***	***NO***
AN/PSN-11(V)1 (note 4), GPS PLGR	YES	YES	YES	YES	***NO***	***NO***
Chemical Agent Monitor, CAM	YES	YES	YES	YES	***NO***	YES
CP-1995/U, Simplified Handheld Terminal Unit (SHTU)	YES	YES	YES	YES	***NO***	***NO***

KEY

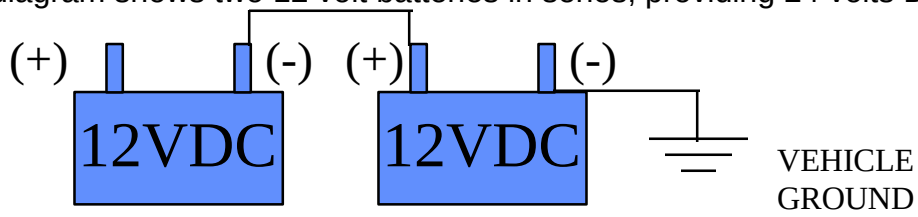
NOTE (1) - BATTERY DEADLINED. THIS BATTERY MUST NOT BE USED.
NOTE (2) - BATTERY VOLTAGE MUST BE CHECKED 5 DAYS AFTER CDD ACTIVATION.
NOTE (3) - WHEN ORDERING BATTERIES FOR THIS EQUIPMENT (ONLY) ADD PROJECT CODE "EKL" IN CC-57-59 OF THE REQUISITION TO ENSURE THAT THE PROPER BATTERIES ARE PROVIDED. LABELS WILL BE AFFIXED TO THESE END ITEMS CAUTIONING AGAINST USING THE BALLARD BATTERY.
NOTE (4) - REMOVE EXTERNAL POWER CABLE WHEN BA-5800 IS INSTALLED IN THIS EQUIPMENT. LABELS WILL BE AFFIXED TO THESE END ITEMS REGARDING THIS RESTRICTION. THESE END ITEMS MAY UTILIZE THE AA BATTERY PACK (USING EITHER 8 ALKALINE OR 8 LITHIUM L91 AA SIZED BATTERIES) OR THE NICD BATTERY WHEN CONNECTED TO EXTERNAL POWER.
YES - BATTERY CAN BE USED IN END ITEM
NO - BATTERY NOT PERMITTED IN END ITEM

AN/PSN-11 GPS PLGR
EXTERNAL POWER CONNECTION REQUIREMENTS

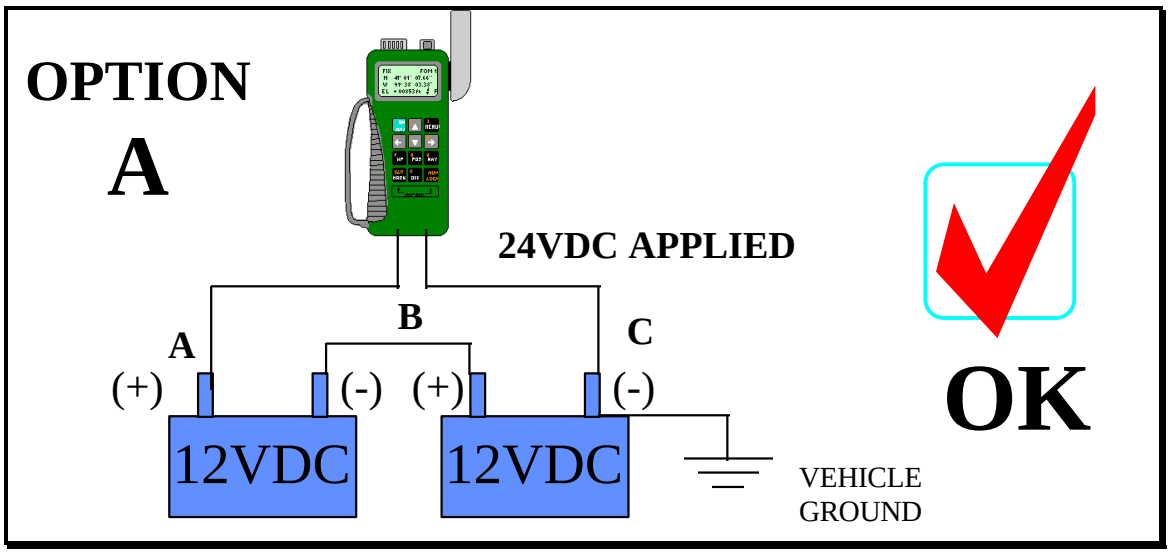
A failure mode of the AN/PSN-11 GPS PLGR has been linked to the improper installation of the wiring harness of the PLGR to the host vehicle. If the host vehicle has two batteries in series and the PLGR connection is made ONLY to the battery not connected to vehicle ground, the PLGR ground will not be the same as vehicle ground. This difference can cause an internal hardware failure inside the PLGR which will cause the memory battery to receive a charge from the host vehicle battery. The Lithium 3.6VDC PLGR memory battery will explode when charged. This deflagration can cause significant bodily harm and equipment damage. The following information is provided for proper installation procedures.

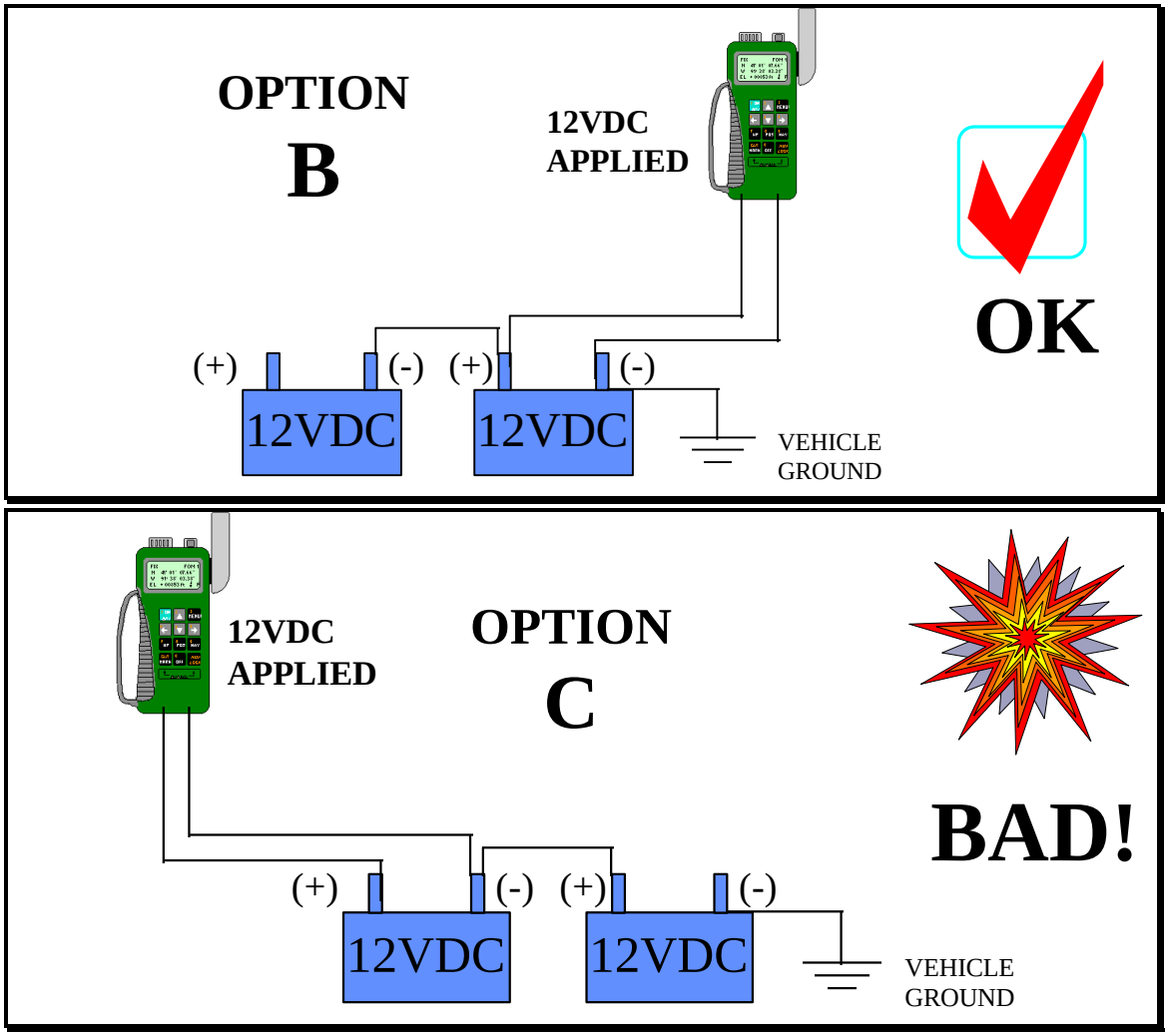
1. The PLGR can be installed into a host vehicle using 9-33 VDC power input.

2. The host vehicle typically has two batteries installed in series. The following diagram shows two 12 volt batteries in series, providing 24 volts DC.



3. There are three ways to connect the PLGR to the batteries:





4. Option A is good

5. Option B is good, but it looks too much like C which is bad

6. Just do A!

☠ FAILURE TO COMPLY WITH THIS INSTALLATION COULD RESULT IN THE EXPLOSION OF THE MEMORY BATTERY WITHIN A FEW MINUTES WHICH COULD RESULT IN SIGNIFICANT DAMAGE AND BODILY INJURY!

Battery Storage

The following battery storage guidelines are provided for all battery types. Typical storage locations include conex structures for bulk storage or smaller facilities for end item users. Precautions are also provided for specific chemistries.

- Store new batteries in original packaging. This helps to identify damage such as swelling or leakage of LiSO2 batteries. Swelling of the bag indicates a battery that has vented.
- Do not mix new and used batteries since it is difficult to distinguish between them. Many next generation batteries will have State of Charge Indicators (SOCI).
- Do not accumulate used batteries, dispose of on a regular basis.
- Segregate storage from other hazardous materials and other battery chemistries. It is critical that lead acid batteries be kept away from nickel cadmium or nickel metal hydride batteries.
- Protect from crushing, punctures, and shorting
- Keep in a cool, dry, well ventilated area, below 130 degrees F.
- Thermal runaway of nickel cadmium batteries may occur if temperatures exceeds 130 degrees F.
- Coordinate battery storage locations with your local fire dept/safety and have periodic inspections conducted by fire dept/safety.
- Protect bulk storage of batteries with sprinkler.
- No smoking or eating
- Ensure that fire extinguishers are available. Use a type AB (H2O) extinguisher to fight fires involving small quantities of batteries. A type D extinguisher would be used to fight a lithium fire (by professional fire fighters)

Battery Handling

The following battery handling guidelines are provided for all battery types. These guidelines are intended for use at battery storage facilities, by the battery users, or any time batteries are handled. Precautions are also provided for specific chemistries.

- Keep batteries in original packaging until ready to use. For example, this helps to identify damage, such as swelling and leakage of LiSO2 batteries.
- Inspect LiSO2 batteries for defects such as bulging, cracks, leakage. Don't use suspect batteries.
- A LiSO2 battery that is abnormally warm to the touch may indicate that the battery CDD has been depressed and is being discharged. Separate such batteries from other batteries.
- A pungent odor - "Rotten Eggs" indicates a LiSO2 battery is in the process of venting. Ventilate the area and get away from the battery until the venting is completed.
- A hissing/popping sound in equipment indicates a LiSO2 battery in the process of venting.
- Use only authorized batteries in equipment. For example, don't substitute the 3.6 volt LS6 lithium AA battery for the 1.5 volt L91 lithium or 1.5 volt alkaline AA batteries to prevent equipment damage. Also, do not mix battery chemistries. For example, use all lithium or all alkaline batteries.
- Remove batteries from equipment for long term storage to prevent damage from battery leakage
- Don't force into equipment since the batteries can be hard or dangerous to remove, causing personal injury and/or damaging equipment and battery.
- Don't mix new and old batteries in equipment to prevent charging of old batteries by new batteries. This could force the old batteries into voltage reversal and a venting.
- Don't short circuit (metal tools).
- NEVER charge primary batteries, other wise batteries can explode violently.
- Don't over discharge batteries. Remove them when they no longer power the equipment.

- Proper Personal Protective Equipment (PPE) must be worn when handling leaking batteries or electrolyte.
- Use only approved test (capacity) meters. The TS-4403A/U is authorized for BA-5588/U, BA-5590/U (BA-5590 batteries manufactured by Saft under DAAB07-90-C-C020 are not permitted to be tested), and BA-5598.

Battery Maintenance

The following maintenance guidelines are to be followed at battery maintenance shops in which vehicle, aircraft, or other rechargeable batteries are maintained.

- Proper PPE must be used when handling leaking batteries or electrolytes.
- PPE - neoprene, rubber or latex-nitrile protective gloves, chemical resistant apron, and eye protection.
- Personnel handling damaged batteries or electrolytes must not wear contact lenses.
- All electrolyte refilling areas must be segregated between battery chemistries.
- The same tools and materials must not be used between battery chemistries. Color code tools for added precaution.
- Nickel cadmium battery shops must be separated from other battery shops and be clearly labeled.
- Do not smoke, have open flames, or make sparks around lead acid batteries since a battery that is gassing can explode.
- Do not smoke in the area of nickel-cadmium batteries.
- Do not strike lead acid battery terminals with metallic tools since this can contribute to sparks and subsequent explosions.
- Make sure vent holes in vent caps are open to prevent dangerous buildup of gases. Ensure caps are screwed on tightly and the rubber gaskets are in place.
- Personnel must be thoroughly trained in battery maintenance procedures, first aid, protective equipment, and precautions and hazards of battery maintenance operations.
- Temperatures of battery maintenance facilities must be kept below 130 degrees F and be well ventilated. Recommend keeping temperatures below 110 degree F.
- Temperatures during NiCd battery charging must be kept below 80 degrees F. Recommend keeping temperatures between 60 and 80 degrees F.

Battery Disposal

This section identifies those batteries that must be disposed of as hazardous waste for environmental concerns. These batteries are typically disposed of through the DRMO. It may also be necessary to dispose of batteries that are not hazardous waste as regulated waste (i.e., through the DRMO), depending on local regulations.

- Batteries that are considered hazardous/regulated waste are the following:
    - Alkaline (AK, CA, MN, RI, WA only)
    - Carbon Zinc (AK, CA, MN, RI, WA only)
    - Lead Acid
    - Mercury
    - Nickel Cadmium
    - Silver
    - Thermal
    - Non-discharged Lithium Sulfur Dioxide (except BA-5567)
    - Lithium Thionyl Chloride
    - Lithium Manganese Dioxide (AK, CA, MN, RI, WA only)
    - Non-discharged Magnesium

- Lithium batteries containing less than 0.5 grams of lithium (i.e., L91 AA size) are non hazardous
- Dispose of hazardous waste through DRMO or local contract approved by HQDA.
- Activate the CDD in the applicable lithium sulfur dioxide batteries to completely discharge the batteries prior to disposal.
- Completely discharged Lithium Sulfur Dioxide and Magnesium batteries are non hazardous waste.
- Dispose of non hazardous waste IAW local regulations.

CDD Activation Procedures

Complete Discharge Devices (CDD) are utilized in multi-cell lithium sulfur dioxide batteries to reduce the amount of reactive lithium at end of life, prior to disposal. The introduction of the CDD has significantly reduced the disposal costs of these batteries. If the CDD is not activated (i.e., on any battery showing signs of damage) the batteries must be disposed of as hazardous waste. CDD's are safe provided that proper activation procedures are performed. The following procedures and precautions must be followed for the safe use of the CDD:

1. Activation of the CDD is to be completed by authorized personnel only. Authorized personnel is defined as a person who is trained in or has experience in the proper storage, handling, and disposal of lithium sulfur dioxide batteries.

2. CAUTION. DO NOT depress the CDD of any battery showing signs of damage such as bulging or cracks. Dispose of such batteries as hazardous waste.

3. Place the batteries in a secure well ventilated area isolated from other personnel and separated from other hazardous material.

4. CAUTION. DO NOT pack the batteries in any container until at least 5 days following activation of the CDD in which the batteries are cool to the touch.

5. Carefully slit or remove the protective label covering the CDD. Carefully depress the CDD and place the battery in the designated area separated from other discharging batteries by at least two inches on all sides.

6. NOTE: It is normal for the batteries to become hot (even to the point of deforming the plastic case) after activating the CDD. However, if a hissing sound or a strong pungent odor is noticed, clear the area immediately until the area is odor free, since this is a battery venting.

7. Allow the batteries to sit for five days minimum prior to disposing of them through the local office of the DRMO. After five days (recommend seven days for more suitable waste removal scheduling), the batteries may be disposed of as non-regulated waste in accordance with local regulations. Notify the DRMO if any of the batteries vent, since they must be disposed of as hazardous waste.

8. NOTE: BA-5590/U batteries manufactured by PCI under contract DAAB07-95-C-G322 must first be checked for the voltage across terminals 1 to 4 and 2 to 5 with a voltmeter. If the voltage is 4 volts or less, the battery may be disposed of as non regulated waste in accordance with local regulations. If greater than 4 volts, it must be returned to PCI for disposal IAW CECOM GPM 96-013, or disposed of as regulated waste.

9. NOTE: BA-5800/u batteries manufactured by PCI under contract DAAB07-94-D-E002, and Saft under DAAB07-94-D-E004 must first be checked for the voltage across the positive and negative terminals. If the voltage is less than 1 volt, the battery may be disposed of as non regulated waste in accordance with local regulations. If equal to or greater than 1 volt, it must

be returned to manufacturer for disposal IAW CECOM GPM 96-012, or disposed of as regulated waste.

Battery Transportation

Packaging and marking guidelines are provided for the transportation of both unregulated and regulated batteries. Regulated batteries include lithium, lead acid, and nickel cadmium batteries.

General Requirements

- You must coordinate shipping of regulated batteries with your local Installation Transportation Office/Officer.
- CECOM Safety Office will provide assistance as necessary.
- Separate damaged and undamaged batteries.
- Batteries must be securely packaged to prevent movement.

Unregulated Batteries. The following batteries are unregulated for shipping purposes:

1.	Alkaline	BA-3XXX series
2.	Carbon Zinc	BA-2 thru BA-471 series
3.	Lithium Sulfur Dioxide	BA-5567 and discharged multi-cell $LiSO_2$ batteries
4.	Lithium Manganese Dioxide	BA-5372 only
5.	Magnesium	BA-4XXX series
6.	Mercury	BA-1XXX series
7.	Silver	BA-245, BA-472, BA-485, BA-486, and BA-2245 only
8.	Thermal	BA-6XX series
9.	Nickel Metal Hydride	All
10.	Lithium Ion	All

Packaging requirements -

Unregulated batteries:

- Prevent short circuits.
- Place batteries in non-reactive plastic bag and seal (except mercury batteries).

Regulated Lithium batteries - Undischarged or damaged multi-cell lithium sulfur dioxide batteries are regulated for shipping purposes

- Prevent short circuits
- For surface vessel (rail, truck, ship) transportation of batteries outside of equipment, packaging must be one of the following: wooden box (4C1, 4C2, 4D, or 4F), fiberboard box (4G), or metal drum (1A2, or 1B2). Each package must not contain more than 500 g of lithium (i.e., no more than 20 BA-5590 batteries per package).
- For air transportation of batteries outside of equipment, inner and outer packaging is required. Inner packaging must be one of the following: wooden box (4C1, 4C2, 4D, or 4F), fiberboard box (4G), or metal drum (1A2, or 1B2). Each package must not contain more than 125 g of Li. The outer package must be a metal drum (1A2 or 1B2) fitted with gas-tight gasket. The inner packages must be separated from each other and outer wall by at least 1 inch of non-combustible cushioning material.
- Maximum quantities per outer package:
    - Commercial Passenger Air - 5 kg of total battery weight per package
    - Commercial Cargo Air - 35 kg of total battery weight per package
    - Military air transport - Batteries must be spares or installed in equipment for training or mission purposes only

Rechargeable batteries, Wet, Filled with acid or alkali (i.e., batteries with vented filler caps such as Lead Acid (vehicle batteries), or Nickel Cadmium (aircraft batteries)):

- Prevent short circuits and damage to terminals
- Place batteries upright into shipping container to prevent spillage of electrolyte.
- Packaging must be one of the following: wooden box (4C1, 4C2, 4D, or 4F), fiberboard box (4G), fiber drum (1G), or plastic drum/boxes (1H2, 3H2, or 4H2)
- Do not stack batteries directly on terminals
- Must not be packaged with other material
- Separate battery chemistries, specifically lead acid from nickel cadmium batteries or nickel metal hydride.
- 1 to 3 batteries (25 lbs each) up to a maximum weight of 75 lbs per outer box.
- 1 to 4 batteries (15 lbs each) up to a maximum weight of 65 lbs per outer box consisting of fiberboard
- 1 to 5 batteries (10 lbs each) up to a maximum weight of 65 lbs per outer box consisting of fiberboard
- Separate and secure away from other hazardous materials

Rechargeable batteries, wet, non-spillable (Lead Acid, Nickel Cadmium, Silver/BB-622):

- Prevent short circuits and damage to terminals
- Packaging must be one of the following: wooden box (4C1, 4C2, 4D, or 4F), fiberboard box (4G), fiber drum (1G), or plastic drum/boxes (1H2, 3H2, or 4H2)
- Must not be packaged with other material
- Separate and secure away from other hazardous materials
- Separate battery chemistries, specifically lead acid from nickel cadmium batteries.
- Can be transported in equipment (i.e., sealed lead acid batteries used in Uninterruptable Power Supplies (UPS)).

Marking Requirements -

Unregulated batteries:

- Identify contents of package with nomenclature and NSN.
- Markings must be in a contrasting color to the packaging.
- The name and address of the shipper and destination must be marked on the container

Regulated Lithium batteries:

- Class 9 requirements must be followed. Affix class 9 label on outside of package.
- Markings must be in a contrasting color to the packaging.
- The name and address of the shipper and destination must be marked on the container
- Battery marking “Lithium battery UN3090”
- Equipment containing lithium battery marked with “Lithium batteries contained in equipment UN3091”

Rechargeable batteries (Lead Acid, Nickel Cadmium, Silver/BB-622):

- Affix corrosive label (class 8) on outside of package.
- Markings must be in a contrasting color to the packaging.
- The name and address of the shipper and destination must be marked on the container
- Lead Acid batteries with vented filler caps. Battery marking “Batteries, wet, filled acid UN2794”
- NiCd with vented filler caps. Battery marking “Batteries, wet, filled alkali UN2795”
- All batteries with out vented filler caps. Battery marking “Batteries, wet, non-spillable UN2800”

Battery Incident Reporting Requirements

This section addresses the requirements that must be followed by the field and CECOM when battery incidents occur.

- Battery incidents causing equipment damage or injury must be immediately reported to CECOM DSRM or Power Sources Team

- Normal mild ventings in which battery bulges or warps during complete discharge process need not be reported but if reported will be followed up with a response

- Reports of all ventings will be investigated and answered

- Recommend that reports be made via telephone. However, the field may report incidents by phone, facsimile, or by email.

- Person taking incident report at CECOM must obtain detailed information including:
  - Name of person reporting incident
  - Phone number where person reporting incident can be reached
  - Organization reporting incident
  - Organization in which incident occurred
  - Location of incident
  - Battery type
  - Battery NSN
  - Battery contract number and date code
  - Battery manufacturer
  - Condition of incident including storage, shipping/handling, use in equipment, storage, test, charging, or disposal processing
  - Seriousness. Was the incident violent? Were there any injuries? How severe? Was there any equipment damage?

- Person reporting incident will usually be required to submit a PQDR, Standard Form SF 368 (see Appendix D) to CECOM. The CECOM PST or DSRM will provide instructions and requirements.

- CECOM PST will determine if battery and/or equipment must be returned to CECOM for evaluation

- Any actions required will be determined and coordinated within CECOM

- Users will be notified of any procedural changes or equipment modifications via the Army Ground Safety Notification System (GPM)

- The incident will be logged into the DSRM accident tracking data base and tracked

Appendix A
CECOM Managed Batteries and Applications

The following information was extracted from SB 11-6 and is provided as a general reference.

TYPE	CHEM	APPLICATION
BA-4		
BA-1006	Hg	AN/PQS-1 IM-174/PD IM-174A,B/PD KS-19B KS-99C1 ME-74/U MK77MOD0 SIDEWINDER TEST SET
BA-1092	Hg	
BA-1093	Hg	VIBRATION METER
BA-1232	Hg	
BA-1312	Hg	AN/PAS-5 AN/PAS-6 AN/PDR-10 AN/PQS-1 AN/USM-223 AN/VRC-53 AN/VRC-64 KS-19B
BA-1393	Hg	
BA-15	Zn-C	KS-14103L5 SB-867A/FQQ SUBROC CAL TS-816/U
BA-261	Zn-C	AN/PAR-1 AN/PMQ-6/6A AN/PSM-4/4A/4B/4C AN/PTM-5 AN/URM-105C AN/USM-319A KE-7-1 KS-15-1/3/4 KS-4B MX989/PP
BA-3517	Alkaline	M8 M8-A1 M11 OQ-290(v)1/MSM
BA-4386	Mg	AN/GRA-114 AN/PPS-15(V)2 AN/PRC-25 AN/PRC-74 AN/PRC-77 AN/PRD-10 AN/PRD-11 AN/PSN-6 AN/URR-69 AN/USA-32 AN/USQ-46 RT-505/PRC-25
BA-44	Zn-C	
BA-4840	Mg	AN/TRN-30(V)1
BA-5093	LiSO2	M-43
BA-5112	LiSO2	AN/PRC-112 KY-913
BA-5372	LiMnO2	AN/GRC-210
BA-5372	LiMnO2	AN/PRC-119 ANPSQ-4 AN/VSQ-1 KYK-13/TSEC OA-9263/GRC PATRIOT RT-1476/ARC RT-1477/ARC RT-1478/ARC SYK-15/TSEC TSEC/KY-84 TSEC/KOI-18 TSEC/KYK-13 TSEC/KYX-15/15A TSEC/KY-57 TSEC/KY-58 TSEC-KY-65 TSEC-KY-68 TSEC-KY-75A
BA-5557	LiSO2	AN/GMQ-33 ANPSQ-2A/2B AN/PSG-5 AN/TMQ-34 M-43A1
BA-5567	LiSO2	AN/AVS-6 AN/PAQ-4/4A AN/PVS-X AN/PVS-4 AN/PVS-5A/B/C AN/PVS-7A/B AN/TVS-5 AN/VVS-2(V)1,2 TSEC/KOK-12
BA-5588	LiSO2	AERP AN/PRC-68/A AN/PRC-126 AN/PRC-128 M-23
BA-5590	LiSO2	AMBIENT BACKPACK AMUT AN/PDR-75 AN/PIH-1 AN/PPN-19 AN/PRC-104 AN/PRC-113 AN/PRC-119 AN/PRC-119A AN/PSC-3 AN/PSQ-4 AN/PSQ-6 (EPLRS) AN/TAS-4A AN/TAS-6A AN/UIH-6 AN/UIH-6A AN/URC-100 AN/URC-110 AN/URN-27 C-10377/GTC C-11166/GRC C-11561(C)/U COMMO DECEPTION

BA-5590	LiSO2	COMPACT LASER DEMONSRATOR EFCS JAVELIN L B S R LST-5 LTM M-22 ACADA M21 MAFIS UFE MST-20 PLUS OD-144/GYK-29 OE-239 PLAYER UNIT PM-15 PM-15A RT-1175/GSQ SAWE-MILES II SM-755/GSQ SOFLAM, AN/PEQ-1 SOLDIER SYSTEM COMPUTER TSEC/HYX-57 TSEC/KY-57 TSEC/KY-67 TSEC/KY-99
BA-5598	LiSO2	AN/GRA-114 AN/GRC-122C AN/GRQ-26 AN/MSC-25 AN/PPS-15B AN/PRC-25 AN/PRC-74 AN/PRC-77 AN/PRD-10 AN/PRD-11 AN/UGC-74/A/B AN/USQ-46 DT-561/GSQ DT-562/GSQ DT-565/GSQ MSC-25 R-2016/GSQ RT-505/PRC-25 TSEC/KY-38 TSEC/KY-65
BA-5599	LiSO2	AN/PAS-7A TS-4161/P
BA-5600	LiSO2	AN/MLQ-36

BA-5600	LiSO2	AN/PSC-2 MU-848/PSC-2
BA-5800	LiSO2	AN/ASN-169 AN/PSG-7 (V)1 AN/PSG-7 (V)2 AN/PSN-10 AN/PSN-11 AN/PSN-11(V)1 CAM CP-1995/U
BA-5847	LiSO2	AN/PRM-34
BB-2847	Li Ion	TWS
BB-388A	NiMH	AN/PRC-126
BB-390A	NiMH	SINCGARS
BB-412	NiCd	AN/ASM-189C AN/ASM-190A AN/GRA-39/B AN/MTC-7 AN/MTC-10 LIFE PRESERVERS ME-9 OQ-290(V)1/MSM SB-22/PT
BB-422	NiCd	
BB-432A	NiCd	CH-47A,B,C
BB-432B	NiCd	CH-47D
BB-433	NiCd	UH-1, OV-1D
BB-476	NiCd	OH-58A,B,C
BB-501	NiCd	AN/TAS-5
BB-503A	NiCd	TOW
BB-516A	NiCd	MELIOS
BB-542	NiCd	AN/PPN-19 AN/PRC-70 AN/PSC-3
BB-557	NiCd	SEE BA-5557
BB-558	NiCd	OH-58D
BB-586	NiCd	SEE BA-4386
BB-622	NiCd	AN/PPS-5
BB-649	NiCd	AH-1
BB-664	NiCd	AH-64
BB-678	NiCd	
BB-693	NiCd	VULCAN
BB-708	NiCd	OV-1D (Mission Gear)
BB-716	NiCd	UH-60

Appendix B
GPM Summary

THE FOLLOWING IS A LISTING OF BATTERY MESSAGES (GPM AND SOUM) ISSUED DURING FY 97.

A. MESSAGE, AMSEL-SF-SEP, DTG171540Z MAR 97, SUBJ: GROUND PRECAUTIONARY MESSAGE (GPM 97-004), LITHIUM-THIONYL CHLORIDE 3.6V, SIZE AA MEMORY BATTERIES, NSN 6135-01-301-8776. REMARKS: ETERNACELL TO6/51 BATTERIES ARE MANUFACTURED BY PCI AND ARE SUBJECT TO LEAKAGE AFTER THE BATTERY IS DEPLETED. THIS HAS BEEN EXPERIENCED WHEN INSTALLED IN THE GPS PLGR. THE LEAKING BATTERY CAN DAMAGE EQUIPMENT AND CAUSE INJURY. GPM REQUIRES BATTERY INSPECTION AND TO REPLACE IF ETERNACELL. STATUS: OPEN. POC: MR. PHIL KLIMEK, DSN 992-0084 X6437.

B. MESSAGE, AMSEL-SF-SEP, DTG311437Z MAR 97, SUBJ: GROUND PRECAUTIONARY MESSAGE (GPM 97-005), AN/PSN-11, NSN 5825-01-374-6643 AND AN/PSN-11(V)1, NSN 5825-01-395-3513, PRECISION LIGHTWEIGHT GPS RECEIVERS (PLGR). REMARKS: INCORRECT VEHICULAR WIRING CAN CAUSE THE PLGR MEMORY BATTERY TO EXPLODE DUE TO CHARGING. GPM REQUIRES INSPECTION OF WIRING AND PROVIDES PROCEDURES FOR CORRECTING ANY ERRORS. STATUS: OPEN. POC: MR. PHIL KLIMEK, DSN 992-0084 X6437 OR MR. DAVID KIERNAN X6447.

C. MESSAGE, AMSEL-SF-SEP, DTG211648Z APR 97, SUBJ: GROUND PRECAUTIONARY MESSAGE (GPM 97-007), ALL EQUIPMENT UTILIZING TWO OR MORE BA-5590/U LITHIUM SULFUR DIOXIDE BATTERIES. REMARKS: PROVIDES INSTRUCTIONS TO REPLACE ALL PRIME POWER BA-5590/U BATTERIES WITH NEW/UNUSED BA-5590/U BATTERIES WITH THE SAME CONTRACT NUMBER AND MANUFACTURER'S DATE CODE. ALL SAFT BATTERIES (NON-PRECONDITIONED AND PRECONDITIONED) THAT ARE REMOVED FOR REPLACEMENT IAW THIS GPM MUST BE DISPOSED OF. ALL PCI BATTERIES REMOVED FOR REPLACEMENT CAN BE USED IN SINGLE BA-5590/U BATTERY APPLICATIONS. STATUS: OPEN. POC'S: MR. PHIL KLIMEK, DSN 992-0084 X6437 OR MR. DAVID KIERNAN X6447.

THE FOLLOWING IS A LISTING OF BATTERY MESSAGES (GPM AND SOUM) ISSUED DURING FY 96.

A. MESSAGE, AMSEL-SF-SEP, DTG 262113Z JAN 96, SUBJ: GROUND PRECAUTIONARY MESSAGE (GPM-96-001), BB-558/A (NSN 6140-01-186-8802) NICKEL CADMIUM BATTERY MANUFACTURED BY SAFT AMERICA, INC., ALL CONTRACTS, USED IN THE OH-58D AIRCRAFT (NSN 1520-01-125-5476). REMARKS: SUBJECT BATTERY HAS EXHIBITED A NUMBER OF VIOLENT VENTINGS/EXPLOSIVE INCIDENTS AND THERMAL RUNAWAY/FIRE. USER AND MAINTENANCE ACTIONS ARE PROVIDED TO MINIMIZE FURTHER INCIDENT. STATUS: CLOSED. THIS MESSAGE WAS SUPERSEDED BY GPM 96-007. POC IS MR. DAVID KIERNAN, DSN 992-0084, EXT 6447.

B. MESSAGE, AMSEL-SF-SEP, DTG 121516Z FEB 96, SUBJ: SAFETY OF USE MESSAGE (SOUM 96-002) ALL MOBILE SUBSCRIBER EQUIPMENT (MSE) SHELTERS. REMARKS: VIOLENT EXPLOSION OCCURRED IN THE AN/TRC-190 SHELTER, DESTROYING THE SHELTER AND EQUIPMENT CONTAINED WITHIN IT. THE LIKELY CAUSE OF THE EXPLOSION WAS DUE TO THE IGNITION OF HYDROGEN PRODUCED BY TWO LEAD ACID BATTERIES. HYDROGEN BUILD UP IN THE SHELTER WAS CAUSED BY IMPROPER REINSTALLATION OF A VENT HOSE TO THE OUTSIDE OF THE SHELTER. PROPER MAINTENANCE PROCEDURES WERE REITERATED. STATUS: CLOSED. POC IS MR. JOHN TOBIAS, DSN 992-0084, EXT 6412.

C. MESSAGE, AMSEL-SF-SEP, DTG 061330Z JUL 96, SUBJ: GROUND PRECAUTIONARY MESSAGE (GPM-96-007), BB-558/A (NSN 6140-01-186-8802) NICKEL CADMIUM BATTERY MANUFACTURED BY SAFT AMERICA, INC., ALL CONTRACTS, USED IN THE OH-58D AIRCRAFT (NSN 1520-01-125-5476). REMARKS: SUBJECT BATTERY HAS EXHIBITED A NUMBER OF VIOLENT VENTINGS/EXPLOSIVE INCIDENTS AND THERMAL RUNAWAY/FIRE. THIS MESSAGE SUPERSEDES GPM 96-001. THIS GPM PROVIDES MODIFIED USER AND MAINTENANCE ACTIONS. STATUS: OPEN. POC IS MR. DAVID KIERNAN, DSN 992-0084, EXT 6447.

D. MESSAGE, AMSEL-SF-SEC, DTG 101649Z JUL 96, SUBJ: GROUND PRECAUTIONARY MESSAGE (GPM 96-008) SMALL LIGHTWEIGHT GLOBAL POSITIONING SYSTEM RECEIVER (SLGR), AN/PSN-10. REMARKS: BALLARD BA-5800 BATTERIES USED IN THE SLGR (TWO BATTERIES) HAVE VIOLENTLY VENTED CAUSING EQUIPMENT DAMAGE AND INJURY. GPM RESTRICTS USE OF THESE BATTERIES IN SLGR. USE OTHER MANUFACTURER'S (PCI, SAFT) BA-5800 BATTERIES, ALKALINE BATTERY PACK, OR EXTERNAL POWER. ALSO, CLARIFIES THAT THERE ARE NO RESTRICTIONS ON THE PLGR, AN/PSN-11, WITH REGARDS TO THE BALLARD BATTERY. STATUS: CLOSED. THIS MESSAGE WAS SUPERSEDED BY GPM 96-012. POC IS MR. PHILIP KLIMEK, DSN 992-0084, EXT 6437.

E. MESSAGE, AMSEL-SF-SEP, DTG 151833Z JUL 96, SUBJ: GROUND PRECAUTIONARY MESSAGE (GPM 96-010) BA-5800/U (NSN: 6665-99-760-9742) LITHIUM SULFUR DIOXIDE BATTERY MANUFACTURED BY POWER CONVERSION, INC. (PCI), CONTRACT DAAB07-94-D-E002. REMARKS: COMPLETE DISCHARGE DEVICE (CDD) USED IN THE PCI BA-5800 BATTERIES (MANUFACTURED PRIOR TO AUG 96) MAY NOT COMPLETELY DISCHARGE BATTERY WHEN ACTIVATED. MEASURE VOLTAGE AFTER 5 DAYS TO DETERMINE IF COMPLETELY DISCHARGED. RETURN BATTERIES CONTAINING DEFECTIVE CDD'S (I.E., NOT COMPLETELY DISCHARGED) TO PCI. STATUS: CLOSED. THIS MESSAGE IS SUPERSEDED BY GPM 96-012. POC IS MR. DAVID KIERNAN, DSN 992-0084, EXT 6447.

F. MESSAGE, AMSEL-SF-SEP, DTG 021401Z AUG 96, SUBJ: GROUND PRECAUTIONARY MESSAGE (GPM 96-011) SMALL LIGHTWEIGHT GLOBAL POSITIONING SYSTEM RECEIVER (SLGR), AN/PSN-10, PRECISION LIGHTWEIGHT GLOBAL POSITIONING SYSTEM RECEIVER (PLGR), AN/PSN-11, AN/ASN-169, STANDALONE AVIATION GPS RECEIVER (SAGR), THE CHEMICAL AGENT MONITOR (CAM), AN/PSG-7, FORWARD ENTRY DEVICE (FED), SIMPLIFIED HANDHELD TERMINAL UNIT (SHTU), CP-1995/U. REMARKS: A VIOLENT VENTING OF THE CROMPTON BA-5800 BATTERY OCCURRED IN THE GPS PLGR WHEN CONNECTED TO VEHICULAR POWER. GPM DEADLINES CROMPTON BATTERIES AND PROVIDES REPLACEMENT PROCEDURES. GPM RECOMMENDS REMOVAL OF ALL BA-5800 BATTERIES FROM THE PLGR WHEN CONNECTED TO EXTERNAL POWER. STATUS: CLOSED. THIS GPM WAS SUPERSEDED BY GPM 96-012. POC IS MR. LEONARD RUSSO, DSN 992-0084, EXT 6414.

G. MESSAGE, AMSEL-SF-SEP, DTG 171952Z SEP 96, SUBJ: GROUND PRECAUTIONARY MESSAGE (GPM 96-012), BA-5800/U (NSN: 6665-99-760-9742) LITHIUM SULFUR DIOXIDE BATTERIES. REMARKS: GPM CONSOLIDATES AND SUPERSEDES GPM'S 96-008, 96-010, AND 96-011, PROVIDES CLARIFICATION AND ADDITIONAL INFORMATION. REITERATES, THE DEADLINING OF CROMPTON BATTERIES, BALLARD BATTERY RESTRICTION IN THE AN/PSN-10 AND AN/ASN-169, AND THE DISPOSAL PROCEDURES FOR PCI BATTERIES WITH REGARDS TO DEFECTIVE CDD'S. THE GPM ALSO PROVIDES NEW DISPOSAL PROCEDURES FOR SAFT BATTERIES REGARDING DEFECTIVE CDD'S, NOW REQUIRES THAT ALL BA-5800 BATTERIES BE REMOVED FROM THE AN/PSN-11 WHEN CONNECTED TO EXTERNAL POWER, AND THAT THE CAM BATTERY CAN ONLY BE USED IN THE CAM. STATUS: OPEN. POC IS MR. DAVID KIERNAN, DSN 992-0084, EXT 6447.

H. MESSAGE, AMSEL-SF-SEC, DTG 201935Z SEP 96, SUBJ: GROUND PRECAUTIONARY MESSAGE (GPM 96-013), BA-5590/U, LITHIUM SULFUR DIOXIDE BATTERIES. GPM CONSOLIDATES AND SUPERSEDES GPM'S 95-006 AND GPM 95-008. REITERATES BATTERY PRECAUTIONS AND RESTRICTIONS, INCLUDING THE RESTRICTION THAT THE SAFT BA-5590 CAN NOT BE USED IN SAWE-MILES II. GPM PROVIDES INFORMATION ON THE PRECONDITIONED SAFT BATTERIES AND NEW NSN (6135-01-435-3097). GPM PROVIDES RECOMMENDED HOUR USAGE CHART FOR THE SAFT BA-5590. ALSO REITERATES THAT PCI BATTERIES CAN BE USED IN SAWE-MILES II AND BE USED TO THE FULL EXTENT OF THEIR USEFUL LIFE. NEW DISPOSAL PROCEDURES ARE PROVIDED FOR PCI BATTERIES DUE TO POSSIBLE DEFECTIVE COMPLETE DISCHARGE DEVICES. STATUS: OPEN. POC IS MR. PHILIP KLIMEK, DSN 992-0084, EXT 6437.

THE FOLLOWING IS A LISTING OF BATTERY MESSAGES (GPM) ISSUED DURING FY 95.

A. MESSAGE, AMSEL-SF-REE, SUBJ: GPM (GPM-95-002/003), BA-5590/U (NSN 6135-01-036-3495) LITHIUM SULFUR DIOXIDE (LISO2) BATTERY. REMARKS: PRECAUTIONS ARE PROVIDED TO

REDUCE THE POSSIBILITY OF A BATTERY VENTING. CONTRACT NUMBERS ARE PROVIDED TO HELP IDENTIFY BATTERIES POSING THE HIGHEST RISK. STATUS: CLOSED. THESE MESSAGES WERE SUPERSEDED BY GPM 95-006. POC IS MR. LOUIS SOFFER, DSN 987-3112, EXT 6434.

B. MESSAGE, AMSEL-SF-REE, SUBJ: GPM (GPM-95-004), BA-5590/U (NSN 6135-01-036-3495) LITHIUM SULFUR DIOXIDE (LISO2) BATTERY. REMARKS: INSTRUCTIONS ARE PROVIDED TO DETERMINE IF BATTERY HAS A DEAD CELL. CONTRACT NUMBERS AND DATE CODES ARE PROVIDED TO HELP IDENTIFY SUSPECT BATTERIES. STATUS: CLOSED. THIS MESSAGE WAS SUPERSEDED BY GPM 95-008. POC IS MR. LOUIS SOFFER, DSN 987-3112, EXT 6434.

C. MESSAGE AMSEL-SF-REE, SUBJ: URGENT GROUND PRECAUTIONARY MESSAGE (GPM-95-006), BA-5590/U (NSN 6135-01-036-3495) LITHIUM SULFUR DIOXIDE (LI-SO2) BATTERY MANUFACTURED BY SAFT AMERICA (ALL CONTRACTS). REMARKS: LIMITED USAGE TIME OF BATTERY IN EQUIPMENT. PROHIBITED USE OF BATTERY IN SAWE/MILES II. PROVIDED GENERAL SAFETY GUIDANCE. STATUS: CLOSED. THIS MESSAGE WAS SUPERSEDED BY GPM 96-013. POC IS MR. LOUIS SOFFER, DSN 987-3112, EXT 6434.

D. MESSAGE AMSEL-SF-REE, SUBJ: GROUND PRECAUTIONARY MESSAGE (GPM-95-008), BA-5590/U (NSN 6135-01-036-3495) LITHIUM SULFUR DIOXIDE BATTERY MANUFACTURED BY POWER CONVERSION INC. OR BY POWER CONVERSION CARIBE INC. (PCI) ALL CONTRACTS, AND LITHIUM BATTERIES IN GENERAL. REMARKS: PERMITS NORMAL USE AND SOC TESTING OF THE PCI 5590 BATTERY. PROVIDED GENERAL SAFETY GUIDANCE AND CLARIFICATION OF GPM 95-006. STATUS: CLOSED. THIS MESSAGE WAS SUPERSEDED BY GPM 96-013. POC IS MR. PHILIP KLIMEK, DSN 992-0084, EXT 6437.

Appendix C
Battery POC's

CECOM Directorate of Safety Risk Management:

1. David Kiernan at DSN: 992-0084 (x6447), commercial (908) 532-0084 (x6447), email is "kiernan@doim6.monmouth.army.mil", facsimile is DSN: 992-6403, commercial (908) 532-6403.

2. Phil Klimek at DSN: 992-0084 (x6437), commercial (908) 532-0084 (x6437), email is "klimek@doim6.monmouth.army.mil", facsimile is DSN: 992-6403, commercial (908) 532-6403.

AMC Battery Management Office:

1. Mr. Richard Rizzo at DSN: 992-8941, commercial (908) 532-8941, email is "rizzo@doim6.monmouth.army.mil".

2. Mr. Rafael Casanova at DSN: 992-8941, commercial (908) 532-8941 , email is "casanova@doim6.monmouth.army.mil".

CECOM LRC Power Sources Team:

1. Ms. Kathleen Skeen at DSN: 992-2411, commercial (908) 532-2411, email is "skeen@doim6.monmouth.army.mil".

2. For PQDR's, Mr. Patrick Lyman at DSN: 992-8824, commercial (908) 532-8824, , email is "lyman@doim6.monmouth.army.mil".

Appendix D - PQDR Form

PRODUCT QUALITY DEFICIENCY REPORT

☐ CATEGORY I ☐ CATEGORY II

1a. FROM (*Originator*)		2a. TO (*Screening point*)	
1b. NAME, TELEPHONE NO. AND SIGNATURE	1c. DATE	2b. NAME, TELEPHONE NO. AND SIGNATURE	2c. DATE

3. REPORT CONTROL NO.	4. DATE DEFICIENCY DISCOVERED	5. NATIONAL STOCK NO. (NSN)	6. NOMENCLATURE

7a. MANUFACTURER/CITY/STATE	7b. MFRS. CODE	7c. SHIPPER/CITY/STATE	8. MFRS. PART NO.

9. SERIAL/LOT/BATCH NO.	10a. CONTRACT NO.	10b. PURCHASE ORDER NO.	10c REQUISITION NO.	10d. GBL NO.	10e. FTM Doc No

11. ITEM REPAIRED/ ☐ NEW ☐ OVERHAULED	12. DATE RECD, MFRD, RE-PAIRED, OR OVERHAULED	13. OPERATING TIME AT FAILURE	14. GOVERNMENT FURNISHED MATERIAL ☐ YES ☐ NO

15. QUANTITY	a. RECEIVED	b. INSPECTED	c. DEFICIENT	d. IN STOCK

16. DEFICIENT ITEM WORKS ON/WITH					
	a. END ITEM (*Aircraft, mower, etc.)*	(1) TYPE/MODEL/SERIES			(2) SERIAL NO.
	b. NEXT HIGHER ASSEMBLY	(1) NATIONAL STOCK NO. (NSN)	(2) NOMENCLATURE	(3) PART NO.	(4) SERIAL NO.

17. UNIT COST $	18. ESTIMATED REPAIR COST $	19a. ITEM UNDER WARRANTY ☐ YES ☐ NO ☐ UNKNOWN	19b. EXPIRATION DATE

20. WORK UNIT CODE/EIC (*Navy and Air Force Only.)*

21. ACTION/DISPOSITION

☐ HOLDING EXHIBIT FOR ____ DAYS ☐ RELEASED FOR INVESTIGATION ☐ RETURNED TO STOCK ☐ DISPOSED OF ☐ REPAIRED ☐ OTHER (*Explain in Item 22)*

22. DETAILS *(Describe, to best ability, what is wrong, how and why, circumstances, prior to difficulty, description of difficulty, cause, action taken, including disposition, recommendations. Attach copies of supporting documents. Continue on separate sheet if necessary.)*

23. LOCATION OF DEFICIENT MATERIAL

24a. TO *(Action Point)*		25a. TO *(Support Point) (Use Items 26 and 27 if more than one)*	
24b. NAME, TELEPHONE NO. AND SIGNATURE	24c. DATE	25b. NAME, TELEPHONE NO. AND SIGNATURE	25c. DATE
26a. TO *(Support Point)*		27a. TO *(Support Point)*	
26b. NAME, TELEPHONE NO. AND SIGNATURE	26c. DATE	27b. NAME, TELEPHONE NO. AND SIGNATURE	27c. DATE

368-102 COMPUTER GENERATED **STANDARD FORM**
368 (REV. 10-85)

Appendix E
Technical Manual Warnings

** WARNING **

Lithium-Sulfur Dioxide
Non-Rechargeable Batteries

Lithium-Sulfur Dioxide ($Li-SO_2$) Batteries have been designed to provide a safe, high capacity power source in a relatively small lightweight package. However, if misused or abused, these batteries can be dangerous.

- $Li-SO_2$ batteries contain liquefied Sulfur Dioxide (corrosive and will cause burns to the skin), acetonitrile (mildly toxic) and Lithium metal (extremely reactive and flammable). All $Li-SO_2$ batteries have multiple safety features to contain these hazards.

- Store $Li-SO_2$ batteries at temperatures below 130 ^{o}F. Segregate different battery chemistries from each other.

- Keep batteries in original packaging until ready for use. Examine packages/batteries for bulging, cracking, or any signs of leakage before putting the batteries into equipment. Use only the appropriate batteries for each particular item.

- When replacing batteries in equipment containing more than one $Li-SO_2$ battery, replace all $Li-SO_2$ batteries at the same time. Replace with batteries from the same contract number and date code only.

- Never, charge a Lithium-Sulfur Dioxide battery.

- Never short circuit the terminals.

- Remove batteries from equipment if it is not to be used within 30 days.

- Depleted batteries should be turned in to designated personnel for disposal processing (CDD activation) and disposal in accordance with local regulations or through the Defense Reutilization Management Office.

- In the event of a venting, clear the area until the pungent odor of Sulfur Dioxide is cleared. Handle leaking batteries with rubber or plastic gloves. Get immediate medical attention for any skin or respiratory irritation.

- Refer to TB 43-0134, BATTERIES, DISPOSITION AND DISPOSAL for additional information.

- DO NOT mix primary and rechargeable batteries in the equipment, such as the BA-5590/U and the BB-390A/U batteries.

- When using $LiSO_2$ batteries, immediately shut equipment off and replace with new batteries upon low power indication.

** WARNING **

Nickel-Cadmium and Nickel-Metal Hydride Rechargeable Batteries

The Nickel-Cadmium (Ni-Cd) batteries and the Nickel-Metal Hydride (Ni-MH) are very similar to one another except that the Ni-MH battery does not contain Cadmium. The Ni-MH is more environmentally friendly than the Ni-Cd battery.

- These batteries may overheat if overcharged or not charged in accordance with the manufacturer's requirements.

- Use only authorized batteries for each equipment item. Use only the authorized charger for the particular battery.

- If the battery is excessively overcharged the internal vents may pop and release Hydrogen gas (extremely flammable) and Potassium Hydroxide (corrosive and will burn your skin). If multiple batteries are being charged in a single location, adequate ventilation must be provided to exhaust possible hydrogen gas released during a venting. Use rubber or plastic gloves when handling leaking batteries.

- If any of the electrolyte comes in contact with the skin, wash the affected area with soap and water and seek immediate medical attention.

- Always segregate Ni-Cd and Ni-MH batteries from Lead-Acid Batteries. Placing them together could result in explosive consequences.

- The batteries may overheat and leak if the terminals are short circuited.

- Depleted batteries that will no longer accept a charge should be turned in for disposal in accordance with local regulations or through the Defense Reutilization Management Office in accordance with local regulations.